

SECTION 4 - CONTROL OF MATERIALS

4-1 MATERIALS AND WORKMANSHIP

4-1.1 General

All materials, parts and equipment furnished by the Contractor in the work shall be new, high grade, and free from defects. Workmanship shall be in accordance with the generally accepted standards. Materials and workmanship shall be subject to the Engineer's approval.

Materials and workmanship not conforming to the requirements of these specifications shall be considered defective and will be subject to rejection. Defective work or material, whether in place or not, shall be removed immediately from the site by the contractor, at his expense, when so directed by the Engineer.

If the Contractor fails to replace any defective or damaged work or material after notice from the Engineer, the Engineer may cause such work or materials to be replaced. The replacement expense shall be deducted from the amount to be paid to the contractor.

Used or secondhand materials, parts and equipment may be used only if permitted by the Special Conditions.

4-1.2 Protection of Work and Materials

The Contractor shall provide and maintain storage facilities and employ such measures as will preserve the specified quality and fitness of materials to be used in the work. Stored materials shall be reasonably accessible for inspection. The Contractor shall also adequately protect new and existing work and all items of equipment for the duration of the contract.

The Contractor shall not, without the City's written consent, assign, sell, mortgage, hypothecate, or remove equipment or materials which have been installed or delivered and which may be necessary for the completion of the contract.

4-1.3 Inspection Requirements

Unless otherwise specified, inspection is required at the source for such typical materials and fabricated items as bituminous paving mixtures, structural concrete, metal fabrication, metal casting, welding, concrete pipe manufacture, protective coating application, and similar shop or plant operations. Steel pipe in sizes less than 18 - inches, vitrified clay and cast iron pipe in all sizes are acceptable upon certification as to compliance with the specifications, subject to sampling and testing by the City. Standard items of equipment such as electric motors, conveyors, elevators, plumbing fixtures, etc. are subject to inspection at the job site only. Special items of equipment such as designed electrical panel boards, large pumps, sewage plant equipment, etc., are subject to inspection at the source, normally only for performance testing. The Special Conditions may specify inspection at the source for other items not typical of

those listed in this subsection.

4-1.3.1 Inspection of Materials Not Locally Produced

When the Contractor intends to purchase materials, fabricated products, or equipment from sources located outside the jurisdictional area of the City, the provisions of this subsection 4-1.3 shall be invoked at the option of the City.

4-1.3.2 Inspection By The City

Should the City elect to make its own inspection at the source, the salaries for City personnel on an 8-hour day and 40-hour week, and costs for normal commuting mileage, will be paid by the City. The Contractor shall reimburse the City at rates established by the City for all-costs in excess of the foregoing which arise from providing this inspection service. For private contracts, all costs of inspection at the source, including salaries and mileage costs, shall be paid by the permittee.

4-1.3.3 Inspection By Others

When the City does not elect to make its own inspection at the source, an inspector or accredited testing laboratory approved by the Engineer, shall be engaged by the Contractor at his expense to inspect the materials, equipment, or process. The approval of inspection services shall be obtained before producing any material or equipment. The inspector or representative of the testing laboratory shall judge the materials by the requirements of the plans and specifications. He shall forward reports required by the Engineer to the City. No materials or equipment shall be shipped nor shall any processing, fabrication, or treatment of such materials be done without proper inspection by the approved agent. These materials shall be subject to reinspection at the job-site.

4-1.4 Tests of Materials

Before incorporation in the work, the contractor shall submit samples of materials, as the Engineer may require, at no cost to the City. The Contractor, at his own expense, shall deliver the materials for testing to the place and at the time designated by the Engineer. Unless otherwise provided, all testing shall be performed under the direction of the Engineer, and at no expense to the Contractor. If the Contractor is to provide and pay for testing, the Specifications will so state. For private contracts, the testing expense shall be borne by the permittee.

The Contractor shall notify the City in writing at least 15 days in advance, of the Contractor's intention to use materials for which tests are specified, to allow sufficient time to perform the tests. The notice shall name the proposed supplier and source of material.

4-1.5 Trade Names or Equals

It is the intent of these specifications to permit the Contractor to supply any of the materials specified or offer an equivalent. The Engineer shall determine whether the material offered is equivalent to that specified. Adequate time shall be allowed for the Engineer to make this determination. The specified contract completion time shall not be affected by any circumstance developing from the provisions of this subsection.

If brands or manufacturers are used or listed in conjunction with products, equipment or materials in the specifications without the words "or equal", equals are allowed, except where wording "No substitution allowed" expressly appears. Except in those instances where the product is designated as "No Substitution Allowed", bid specifications will list at least two brands or trade names of comparable quality or utility followed by the words "or equal". Where "or equal(s)" are allowed for any product, equipment or materials, they must meet all the requirements of the bid specifications to the satisfaction of the City and must be in current production. For all "or equal(s)", Contractor shall make submittals after Notice to Proceed for evaluation, unless otherwise required in the Bid Requirements.

The Contractor shall, at his expense furnish data concerning items offered by him as equivalent to those specified. He shall have the material tested as required by the Engineer to determine that the quality, strength, physical, chemical, or other characteristics, including durability, finish, efficiency, dimensions, service, and suitability are such that the item will fulfill its intended function.

Test methods shall be subject to the approval of the Engineer. Test results shall be reported promptly to the Engineer, who will evaluate the results and determine if the substitute item is equivalent. The Engineer's findings shall be final. Installation and use of a substitute item shall not be made until approved by the Engineer.

If a substitute offered by the contractor is found to be not equal to the specified material, the Contractor shall furnish and install the specified material.

4-1.6 Compaction Tests

Relative compaction of soil in trenches, embankment or structural backfill shall be determined by the laboratory standard of test procedure ASTM D1557. To be considered a "passing" test, compaction tests shall meet the required relative percent compaction and indicate a moisture content within 2% of optimum. This is an goal to try and meet. In some instances, 2% moisture cannot be achieved, however, the Contractor should try to get as close to 2% moisture as possible. . Drive-tube sampling of compacted soil may be utilized, unless otherwise directed by the Engineer.

The Contractor shall give notice to the Engineer two (2) working days in advance of when the required compaction tests are to be taken. Normally, the first series of tests will be taken at the expense of the City. Any further tests needed to check recompacted areas because of a failure to pass the original test shall be at the expense of the Contractor. The Engineer may specify the locations where compaction tests are to be taken.